GENERATING ELECTRICITY FROM NUCLEAR ENERGY IN INDIA: LEGAL ASPECTS

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"One of the reasons for preferring nuclear energy as an alternative source of energy is that it is a clean, safe, reliable and competitive energy source which can replace a significant part of the fossil fuels like coal, oil, gas etc. Oil and natural gas resources might exhaust themselves."

-Hon'ble K.S. Radhakrishnan, J.[1]

Abstract: The present State, being a welfare State, is under obligation to make available electricity to every person on equitable basis. It must ensure the generation of electricity in sustainable method, causing minimum loss to the present generation for serving the best interests of the future generation. One of the sources of electricity generation is nuclear energy which is thought to be clean source of energy. This paper unearths the provisions relating to generation of electricity from nuclear energy.
Keywords: Energy, Electricity, Nuclear, Electricity Generation.

Introduction:

Energy, in varied forms, is an essential element for existence and survival of not only human beings but also for other creatures. The main source of energy in this universe is Sun. All, the flora and fauna, are completely dependent on it for various activities. In modern age, the human beings, through their innovative nature, have searched and developed various forms of energy sources broadly classified as non-renewable energy (coal, petroleum, natural gas, nuclear energy etc.) and renewable energy (solar energy, wind energy, geothermal energy, bioenergy, tidal energy, etc.). These are the primary sources of generating electricity by converting it into electrical power. The modern world, which is completely based on electricity power for various developmental activities, without energy cannot be thought of. From lighting our homes and offices to advancements in every walk of life including transportation, defence, health, education, technology, judicial system in addition to essential services like-cooking, cooling, heating etc., everything is dependent on electricity. In nutshell, electricity is the backbone of world's energy supply. It is national asset on which the growth and development of the nation rests. Our daily life, particularly in urban areas, will be completely paralysed, if electricity is not supplied. Thus, it is very clear that electricity generation and its equitable distribution is a necessary function of the State in modern age.

Electricity Generation from Nuclear Energy: A Snapshot

At the time of its independence, India was a power deficit country and in seven decades it has improved a lot in power sector in terms of electricity generation. As per *All India Electricity Statistics General Review 2024*[2], only

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[1] *G. Sundarrajan v. Union of India & others*, (2013) 6 SCC 620.

[2] *All India Electricity Statistics General Review 2024*, Government of India, May 2024 available at https://cea.nic.in/wp-content/uploads/general/2024/General_Review_2024_2.pdf

1.63% electricity was generated by the nuclear energy in India whereas thermal (57.03%), hydro (11.26%) and renewable (30.08%) energy sources have occupied the major chunk of electricity generation in India during 2022-23. In present scenario, the installed electricity generation capacity of India may be viewed as depicted in Table-1 for the years 2017-2024.

Table-1: Installed Electricity Generation Capacity in India- Mode-wise[3] (MWe)

Sl. No.	As on	Thermal	Nuclear	RES	Total
1.	31.03.2017	218,330	6,780	103,037	328,146
2.	31.03.2018	222,907	6,780	115,945	345,631
3.	31.03.2019	226,279	6,780	124,811	357,871
4.	31.03.2020	230,600	6,780	133,955	371,334
5.	31.03.2021	234,729	6,780	142,012	383,521
6.	31.03.2022	236,109	6,780	156,608	399,497
7.	31.03.2023	237,269	6,780	172,010	416,059
8.	31.03.2024	243,217	8,180	190,573	441,970

RES:-Renewable Energy Sources includes Hydro capacity of 25.00 MW and below as reported by MNRE.

It is evident from Table-1 that the thermal power has more installed capacity for electricity generation whereas nuclear power electricity generation capacity is least. In 2024, the electricity generation capacity by nuclear power has been increased from 6780 to 8180 MW. Table-2 exhibits the data of gross electricity generation in India for the years 2017-2024.

Table-2: Gross Electricity Generation in India- Mode-wise[4] (GWh)

Sl. No.	As on	Thermal	Hydro	Nuclear	RES	Total
1.	31.03.2017	993,516	122,378	37,916	81,548	1,235,358
2.	31.03.2018	1,037,14	126,123	38,346	101,839	1,303,455
3.	31.03.2019	1,072,314	134,894	37,813	126,759	1,371,779
4.	31.03.2020	1,042,838	155,769	46,472	138,337	1,383,417
5.	31.03.2021	1,032,611	150,300	43,029	147,248	1,373,187
6.	31.03.2022	1,114,811	151,627	47,112	170,912	1,484,463
7.	31.03.2023	1,206,390	162,099	45,861	203,555	1,617,904
8.	31.03.2024	1,326,549	134,054	47,937	225,835	1,734,375

Source: *Growth of Electricity Sector in India from 1947-2024*, Central Electricity Authority, New Delhi.

The gross electricity generation is basically occupied by the thermal power which is in increasing mode but the electricity generated from nuclear power is at unstable rate. The requirement is to work and make nuclear energy as the main source of electricity generation which is very much required for

[3] *Growth of Electricity Sector in India from 1947-2024*, Central Electricity Authority, New Delhi available at https://cea.nic.in/wp-content/uploads/pdm/2024/08/Growth_Book_2024.pdf

[4] *Ibid.*

having a sustainable environment as the nuclear energy in generating electricity does not produce carbon.

The first nuclear power plant in India was Tarapur Atomic Power Station (Units 1 and 2), supplied by General Electric USA, which became operational in year 1969 and the Kudankulam Nuclear Power Station (Unit-2) is the latest nuclear power plant operationalized in 2017 with the cooperation of Russian Federation.

Electricity Generation in India: Legal Framework

The generation of electricity took place during British rule in India particularly in the year 1879 with the demonstration of electric lighting in Calcutta. Thereafter, with the help of technological advancements the electricity generation became possible through different sources. At the same time, it is also important to note that with the objectives of proper regulation the Government of India enacted its first legislation *i.e.* Indian Electricity Act, 1887 which was repealed and replaced by the Indian Electricity Act, 1903. The Act of 1903 was replaced by the Indian Electricity Act, 1910. During this period the electricity supply industry was in the hands of private sector. The Electricity Act, 1948 was enacted for the regional coordination in the development of electricity transcending the geographical limits of local bodies. Further, the Electricity Act, 2003 came into form of law by repealing the Indian Electricity Act, 1910, the Electricity (Supply) Act, 1948 and the Electricity Regulatory Commissions Act, 1998.

In the year 1948 the Constituent Assembly of India discussed regarding the formal legal framework to regulate atomic energy and accordingly enacted the Atomic Energy Act, 1948. Taking into account the expansion in atomic energy and development, control and use of atomic energy for the welfare of the people of India and for other peaceful purposes, the Parliament of India enacted the Atomic Energy Act, 1962 by repealing the earlier Act of 1948. This Act provides the basic regulatory framework for the regulation of nuclear energy related activities. This Act was substantially amended in 1987 empowering the Central Government to produce and supply electricity from atomic energy.

The Central Government under section 22 of the Atomic Energy Act, 1962 is under legal obligation-

(a) to develop a sound and adequate national policy in regard to atomic power,
(b) to co-ordinate such policy with the Central Electricity Authority and the State Electricity Boards and other similar statutory corporations concerned with the control and utilisation of other power resources,
(c) to implement schemes for the generation of electricity in pursuance of such policy
(d) to operate, either by itself or through any authority or corporation established by it or a Government company, atomic power stations in the manner determined by it in consultation with the Boards or Corporations concerned, with whom it shall enter into agreement regarding the supply of electricity so produced;

Further, the Central Government is obliged-

(a) to fix rates for and regulate the supply of electricity from atomic power stations either by itself or through any authority or corporation established by it or a Government company, in consultation with of the Central Electricity Authority;
(b) to enter into arrangements with the Electricity Board of the State in which an atomic power station is situated either by itself or through any authority or corporation established by it or a Government company for the transmission of electricity to any other State

Madras High Court in *Scientific Officer v. P. Sukumar*[5], discussing the provisions of section 22 observed that "though there is no doubt of the intent on the part of the legislature intended to regulate and control the development, use and disposal of atomic energy. However, it appears that it was not even meant to completely exclude private participation." It means private players also can be allowed in generating electricity from nuclear energy.

To achieve the objective of nuclear power generation, the Nuclear Power Corporation of India was established in 1987. Further, in tune with national policy the Central Government with the active coordination and cooperation of Atomic Energy Commission, Bhabha Atomic Research Centre, Nuclear Power Corporation of India, Atomic Energy Regulatory Board etc. set up and currently operating twenty-two nuclear power reactors in the country with an installed capacity of 8180 MWe.

The question before Hon'ble Supreme Court of India in *G. Sundarrajan v. Union of India & others*[6], was raised against the setting up of a nuclear power plant at Kudankulam in Tamil Nadu. Mentioning the need and importance of nuclear energy the Court observed that "economic growth and energy support have to go hand in hand, for the country's development for which India has entered into various collaboration agreements with U.S.A., Canada, Russia etc. and several Nuclear Power Plants (NPPs) have already been set up in the country… National and International policy of the country is to develop, control and use of atomic energy for the welfare of the people and for other peaceful purposes. NPP has been set up at Kudankulam as part of the national policy which is discernible from the Preamble of the Act and the provisions contained therein. It is not for Courts to determine whether a particular policy or a particular decision taken in fulfillment of a policy, is fair. Reason is obvious, it is not the province of a court to scan the wisdom or reasonableness of the policy behind the Statute." Though the Court did not accept the prayer for closure of nuclear power plant but it warned to have necessary safety measures and reminded the concerned authorities as: *"Be alert, remain always alert and duty calls you to nurture constant and sustained vigilance and nation warns you not to be complacent and get into a mild slumber".*

Concluding Observations:

As per the report of the International Atomic Energy Agency (IAEA)[7], "electricity production from nuclear power rose by 2.6% in 2023 compared to

[5] W.P. Nos.42419 decided on 15 June, 2022 (Madras).
[6] (2013) 6 SCC 620.
[7] IAEA Releases Nuclear Power Data and Operating Experience for 2023 available at https://www.iaea.org/newscenter/news/iaea-releases-nuclear-power-data-and-operating-experience-for-2023

2022. Nuclear power continued to generate almost 10% of the world's electricity. The USA is the world's top producer of nuclear electricity, followed by China and France." Further, India with other signatory countries has also accepted its obligation in the United Nations Climate Change Conference, held in December, 2023 in Dubai, "to accelerate the deployment of low-emission energy technologies including nuclear power for deep and rapid decarbonization, particularly in hard-to-abate sectors such as industry." Thus, it is evident from above discussion that the nuclear energy being the environment-friendly source of energy is the best mode of generating electricity. India must also take active and effective steps towards increasing amount of electricity by nuclear energy. As per the report of *Ministry of Power*, Government of India[8] "8000 MW of Nuclear Capacity is under construction and the total anticipated nuclear capacity addition by 2031-2032 will be 12200 MW."

The requirement is to make public aware about benefits and safety measures about nuclear energy which, in turn, will provide cooperation from public without any oppose particularly in case of setting up any nuclear power plant. At the same time, the international level cooperation is also very much needed to access advanced technologies and best practices. Keeping pace with the world community, India too must work to make nuclear energy as a transformative energy source of Vikshit Bharat.

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[8] Ministry of Power, *28.8 GW power capacity added during March 2022 to December 2023; total installed electricity capacity of the nation stands at 428 GW: Union Power and New & Renewable Energy Minister*, 08 February, 2024 available at https://pib.gov.in/PressReleaseIframePage.aspx?PRID=2003930